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ABSTRACT

This fourth in a series of six learning modules on instructional evaluation is designed to give secondary and postsecondary vocational teachers help in devising and administering evaluation devices for assessing student performance in an occupational skills area. The terminal objective for the module is to assess student psychomotor (skills) performance in an actual school situation. Introductory sections relate the competency dealt with in this module to others in the program and list both the enabling objectives for the three learning experiences and the resources required. Materials in the learning experiences include required reading, self-check quiz, model answers, performance checklists, and the teacher performance assessment form for use in evaluation of the terminal objective. (The modules on instructional evaluation are part of a larger series of 100 performance-based teacher education (PBTE) self-contained learning packages for use in preservice or inservice training of teachers in all occupational areas. Each of the field-tested modules focuses on the development of one or more specific professional competencies identified through research as important to vocational teachers. Materials are designed for use by teachers, either on an individual or group basis, working under the direction of one or more resource persons/instructors.) (EM)

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ED149097

MODULE

D-4

Assess Student Performance: Skills

MODULE D-4 OF CATEGORY D—INSTRUCTIONAL EVALUATION
PROFESSIONAL TEACHER EDUCATION MODULE SERIES

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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CE 014 333

FOREWORD

This module is one of a series of 100 performance-based teacher education (PBTE) learning packages focusing upon specific professional competencies of vocational teachers. The competencies upon which these modules are based were identified and verified through research as being important to successful vocational teaching at both the secondary and post-secondary levels of instruction. The modules are suitable for the preparation of teachers in all occupational areas.

Each module provides learning experiences that integrate theory and application; each culminates with criterion referenced assessment of the teacher's performance of the specified competency. The materials are designed for use by individual or groups of teachers in training working under the direction and with the assistance of teacher educators acting as resource persons. Resource persons should be skilled in the teacher competency being developed and should be thoroughly oriented to PBTE concepts and procedures in using these materials.

The design of the materials provides considerable flexibility for planning and conducting performance-based preservice and inservice teacher preparation programs to meet a wide variety of individual needs and interests. The materials are intended for use by universities and colleges, state departments of education, post-secondary institutions, local education agencies, and others responsible for the professional development of vocational teachers. Further information about the use of the modules in teacher education programs is contained in three related documents: **Student Guide to Using Performance-Based Teacher Education Materials, Resource Person Guide to Using Performance-Based Teacher Education Materials** and **Guide to Implementation of Performance-Based Teacher Education.**

The PBTE curriculum packages are products of a sustained research and development effort by The Center's Program for Professional Development for Vocational Education. Many individuals, institutions, and agencies participated with The Center and have made contributions to the systematic development, testing, revision, and refinement of these very significant training materials. Over 40 teacher educators provided input in development of initial versions of the modules; over 2,000 teachers and 300 resource persons in 20 universities, colleges, and post-secondary institutions used the materials and provided feedback to The Center for revision and refinement.

Special recognition for major individual roles in the direction, development, coordination of testing, revision, and refinement of these materials is extended to the following program staff: James B. Hamilton, Program Director; Robert E. Norton, Associate Program Director; Glen E. Fardig, Specialist; Lois Harrington, Program Assistant; and Karen Quinn, Program Assistant. Recognition is also extended to Kristy Ross, Technical Assistant; Joan Jones, Technical Assistant; and Jean Wisenbaugh, Artist for their contributions to the final refinement of the materials. Contributions made by former program staff toward developmental versions of these materials are also acknowledged. Calvin J. Cotrell directed the vocational teacher competency research studies upon which these modules are based and also directed the curriculum development effort from 1971–1972. Curtis R. Finch provided leadership for the program from 1972–1974.

Appreciation is also extended to all those outside The Center (consultants, field site coordinators, teacher educators, teachers, and others) who contributed so generously in various phases of the total effort. Early versions of the materials were developed by The Center in cooperation with the vocational teacher education faculties at Oregon State University and at the University of Missouri-Columbia. Preliminary testing of the materials was conducted at Oregon State University, Temple University, and University of Missouri-Columbia.

Following preliminary testing, major revision of all materials was performed by Center Staff with the assistance of numerous consultants and visiting scholars from throughout the country.

Advanced testing of the materials was carried out with assistance of the vocational teacher educators and students of Central Washington State College; Colorado State University; Ferris State College, Michigan; Florida State University; Holland College, P.E.I., Canada; Oklahoma State University; Rutgers University; State University College at Buffalo; Temple University; University of Arizona; University of Michigan-Flint; University of Minnesota-Twin Cities; University of Nebraska-Lincoln; University of Northern Colorado; University of Pittsburgh; University of Tennessee; University of Vermont; and Utah State University.

The Center is grateful to the National Institute of Education for sponsorship of this PBTE curriculum development effort from 1972 through its completion. Appreciation is extended to the Bureau of Occupational and Adult Education of the U.S. Office of Education for their sponsorship of training and advanced testing of the materials at 10 sites under provisions of EPDA Part F, Section 553. Recognition of funding support of the advanced testing effort is also extended to Ferris State College, Holland College, Temple University, and the University of Michigan-Flint.

Robert E. Taylor
Director
The Center for Vocational Education

THE CENTER FOR VOCATIONAL EDUCATION
The Ohio State University 1960 Kenny Road Columbus Ohio 43210

The Center for Vocational Education's mission is to increase the ability of diverse agencies, institutions, and organizations to solve educational problems relating to individual career planning and preparation. The Center fulfills its mission by:

- Generating knowledge through research.
- Developing educational programs and products.
- Evaluating individual program needs and outcomes.
- Installing educational programs and products.
- Operating information systems and services.
- Conducting leadership development and training programs.

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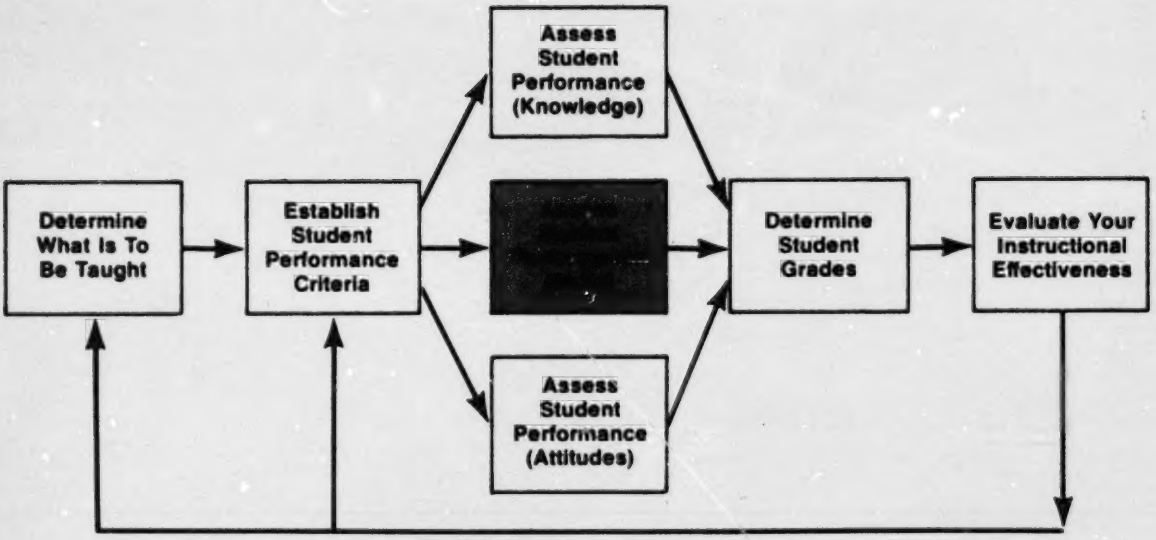

Assess Student Performance (Knowledge)
Determine What Is To Be Taught
Establish Student Performance Criteria
Determine Student Grades
Evaluate Your Instructional Effectiveness
Assess Student Performance (Attitudes)

INSTRUCTIONAL EVALUATION PROCESS

INTRODUCTION

The very nature of vocational education requires that students be trained in the skills needed to perform on the job. Since these are "performance" skills, many of the objectives in vocational education fall within the psychomotor, or physical skills, area. Most performance objectives include learning from all three areas of learning: cognitive (knowledge), affective (attitudes and values), and psychomotor (skills). For example, to achieve the overall objective, "Tune an engine so it runs smoothly," involves knowledge (e.g., "know the parts of the engine"), attitudes (e.g., "value a smooth-running engine"), and skills (e.g., "demonstrate skill in gapping spark plugs").

This module is concerned with assessing the psychomotor (skill) objectives and/or the skill areas within a broad objective. This involves the evaluation of both the **process** used by students in meeting an objective (how they go about the task), and the **product** they create as a result of that process.

Evaluation in the skills area of instructional objectives requires more than giving a paper-and-pencil type of test. It is logical that if you want to know whether a person can **do** something, you watch him/her do it, and judge the performance for yourself. This requires the development of observational devices such as checklists and rating scales which can be used to evaluate both the procedures the student used and the product that was completed. These devices, if adequately developed, can be used both by the teacher and by students. Involving students in their own evaluation through the use of specially constructed devices involves them in the learning process, helps them develop a sense of self-worth and independence, and, most important, trains students to recognize acceptable standards of workmanship.

This module is designed to give you skills in devising and administering evaluation devices for assessing student performance in the occupational skills area—devices that are valid and reliable and readily usable by both you and your students.

ABOUT THIS MODULE

Objectives

Enabling Objectives:

1. After completing the required reading, demonstrate knowledge of the important considerations involved in selecting and administering evaluation devices for assessing student psychomotor performance (*Learning Experience I*).
2. After completing the required reading, construct a performance test for evaluating student achievement of a psychomotor performance objective (*Learning Experience II*).

Resources

A list of the outside resources which supplement those contained within the module follows. Check with your resource person (1) to determine the availability and the location of these resources, (2) to locate additional references in your occupational specialty, and (3) to get assistance in setting up activities with peers or observations of skilled teachers, if necessary. Your resource person may also be contacted if you have any difficulty with directions, or in assessing your progress at any time.

Learning Experience I

Optional

Reference: Leighbody, G. B. and D. M. Kidd. *Methods of Teaching Shop and Technical Subjects.* New York, NY: Delmar Publishers, 1966.

Reference: Boyd, Joseph L., Jr. and Benjamin Shimberg. *Handbook of Performance Testing.* Princeton, NJ: Educational Testing Service, 1971.

Reference: Popham, W. James. *Evaluating Instruction.* Englewood Cliffs, NJ: Prentice-Hall, 1973.

Learning Experience II

Optional

Reference: Popham, W. James. *Evaluating Instruction.* Englewood Cliffs, NJ: Prentice-Hall, 1973.

Learning Experience III

Required

An actual school situation in which you can assess student psychomotor performance.

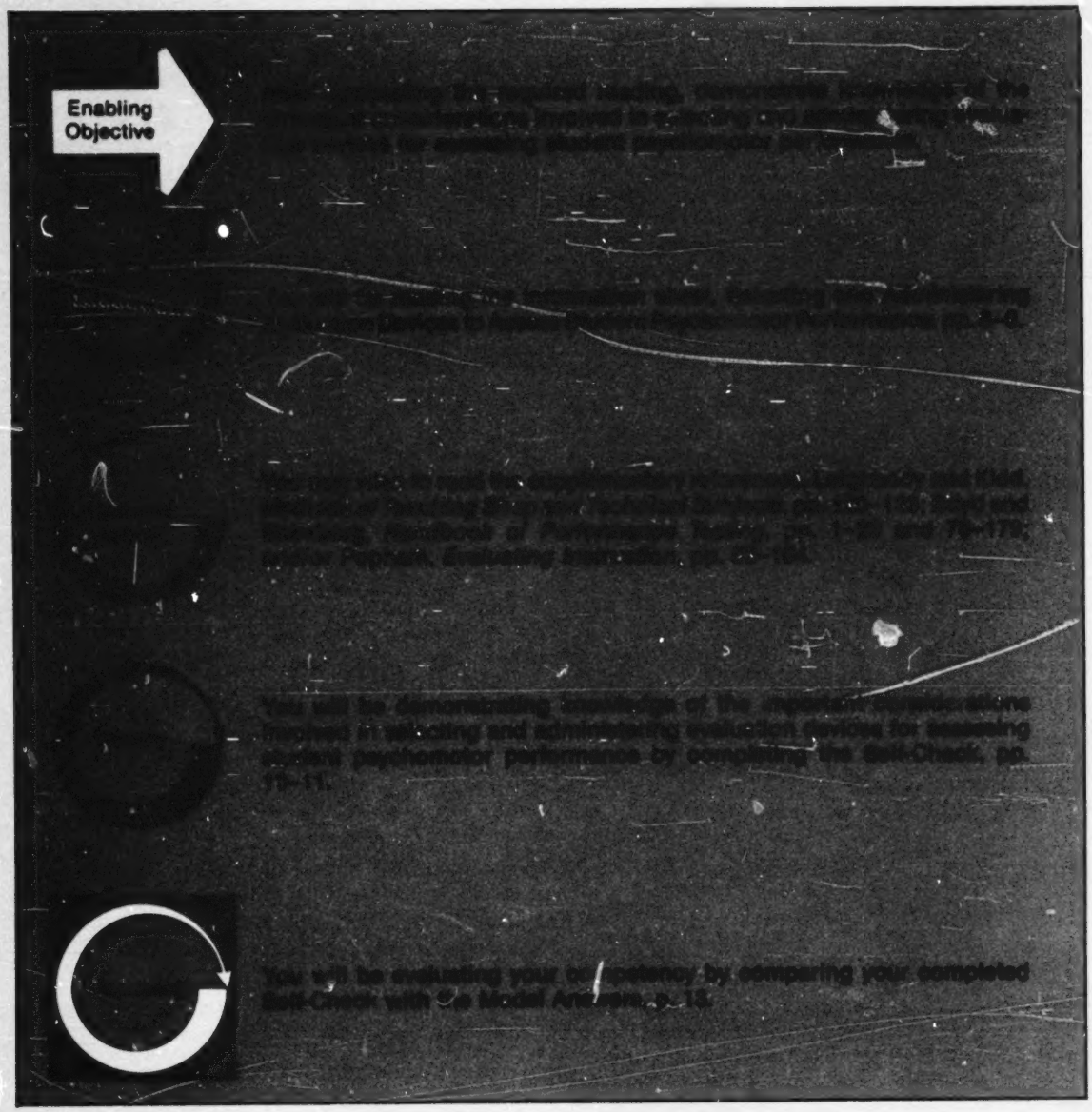
A resource person to assess your competency in assessing student psychomotor performance.

This module covers performance element numbers 141, 142, 144–146, 154, 155, 157, 159, 160 from Calvin J. Cotrell *et al., Model Curricula for Vocational and Technical Education: Report No. V* (Columbus, OH: The Center for Vocational Education, The Ohio State University). The 384 elements in this document form the research base for all The Center's PBTE module development.

For information about the general organization of each module, general procedures for their use, and terminology which is common to all 100 modules, see About Using The Center's PBTE Modules on the inside back cover.

Learning Experience I

OVERVIEW



Activity

For information on psychomotor objectives and on how to select and administer devices to evaluate student achievement of this type of objective, read the following information sheet:

SELECTING AND ADMINISTERING EVALUATION DEVICES TO ASSESS STUDENT PSYCHOMOTOR PERFORMANCE

Psychomotor objectives involve motor or skill-centered activities. This type of objective (thread a sewing machine, light a blowtorch, correct a typing error, install a piston) typically involves (1) following a particular sequence of procedures, (2) performing each procedure to a certain level of competency, and/or (3) creating an end product or result which meets certain criteria. Any one or all of these three areas can be evaluated through observations.

Objectives which are primarily concerned with skills are recognizable by their use of **action** verbs which indicate a very specific skill. For example—

Adjust	Fit	Mind	Rip	Stock
Apply	Fix	Mix	Roll	Straighten
Assemble	Grind	Mold	Sand	Strike
Blend	Grow	Nail	Saw	Switch
Calibrate	Guide	Operate	Set	Tear
Carve	Hammer	Peel	Sew	Transfer
Conduct	Handle	Pin	Shake	Trim
Connect	Heat	Plant	Sharpen	Tune
Construct	Hook	Position	Shorten	Turn
Convert	Increase	Prepare	Shovel	Twist
Cut	Insert	Raise	Shut	Type
Decrease	Keep	Remove	Slip	Weave
Demonstrate	Lengthen	Replace	Slide	Weigh
Dissect	Limit	Report	Spread	Wipe
Fasten	Make	Reset	Start	Wrap
Feed	Manipulate			

Evaluation Devices

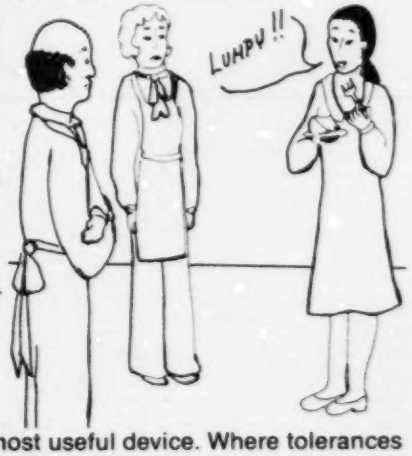
When you, as a vocational teacher, want to determine whether a student has achieved a desired skill, you may look at the **process** the student went through, the **final product** that the student produced, or perhaps **both.** Sometimes, following the correct process is all important when, for example, a child care worker teaches children a new game, or a receptionist handles a client who wants an appointment. At other times, it is far better to evaluate the final product (e.g., a threaded pipe, a pressed garment, or manicured fingernails) to see whether the student has achieved the skill.

Some skills must not only result in a product of acceptable quality, but must be done in a very carefully prescribed way. In taking a dental X-ray, for instance, not only must the developed X-ray be technically correct, but the picture-taking procedure must be followed exactly in order to prevent injury to patient and technician.

Checklists and **rating scales** are commonly used to evaluate the processes used and products produced by students. Well-constructed checklists and rating scales contain explicit criteria for judging student performance. These criteria help the evaluator to focus his or her observations on the critical aspects of the objectives, and to assure that these observations are as objective as possible.

In most cases, checklists are appropriate for evaluating procedures (process), and rating scales are appropriate for evaluating products. This is not a hard-and-fast rule, but it is generally valid. If **specific procedures** are listed, then the **checklist** (YES or NO) is appropriate because each detailed step was either accomplished or not. For example, if a student is being evaluated on procedures used in preparing a cake, an item on a checklist might be "stirred the batter until smooth." This could be answered YES or NO.

On the other hand, in evaluating the **final product,** it is preferable to evaluate more than simply whether or not criteria were accomplished. You also need to indicate the **quality** of the performance. For this, the **rating scale** is more appropriate. For example, when that cake is finally made, one of the evaluation criteria on the rating scale could be "The texture of the cake was uniform." The uniformity of the texture could then be rated on a scale from 1–5, from "non-uniform and/or lumpy" to "very uniform and smooth."

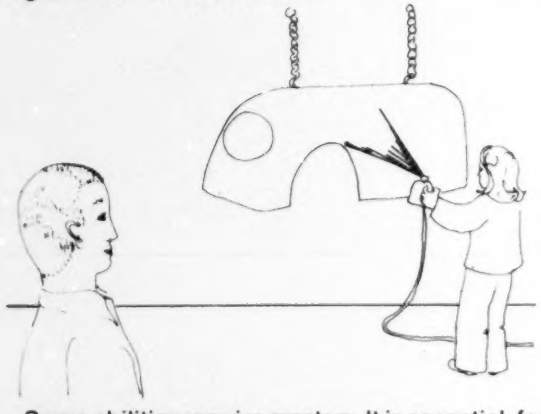


The use of the checklist versus the rating scale will vary somewhat based on the tolerances allowed for successful performance. Where qualitative judgments are important, the rating scale is the most useful device. Where tolerances are close or "either/or" performances are involved, the checklist is more useful. The use of checklists and rating scales is especially appropriate when (1) you are administering a performance test, and (2) you are evaluating student psychomotor performance in the classroom, laboratory, or on the job. A discussion of these situations follows.

Performance Tests

One of the most useful methods for determining the level of the students' skill is by giving a performance test. In this type of test, a problem or task (e.g., "weld an aluminum casting") is specified. The students are then required to solve the problem or perform the task using the supplies and equipment furnished to them. As each student performs, you would observe and evaluate the procedures followed. At the conclusion of the performance, the finished products are also evaluated.

Performance tests can sometimes be used to determine the level at which students can perform particular skills prior to instruction. Instruction, thus, can be based on the students' need for additional skill. There is little point in teaching a skill if the student can already do it. Caution has to be exercised in using performance tests as a pretest if safety hazards are involved in the performance. Performance tests can also be used to pre-assess the level of student performance when it would be costly or uncorrectable for a mistake to be made during the process. For example, a student can be asked to spray-paint a spare fender before spraying a customer's automobile.



Some abilities require mastery. It is essential, for instance, for a nurse to master the critical task of giving a patient a hypodermic injection, or for a pilot to land an airplane successfully. In such cases, in which everyone must reach a given level (defined as mastery), it is imperative that such abilities be evaluated by performance tests.

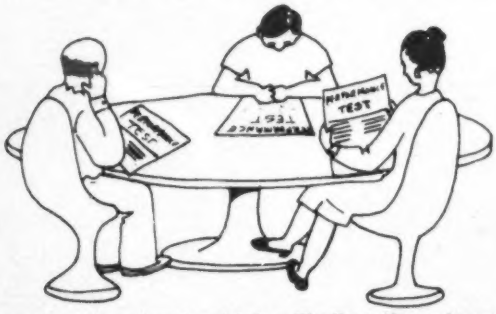
Many teachers use performance tests at the end of a demonstration when only simple skills are involved (e.g., using simple tools correctly). This allows you to get immediate feedback on the effectiveness of the demonstration and how much each student learned from it. In the case of more complex skills, students need an opportunity to practice the skills before being given a performance

test. In other cases, such as with typing or shorthand skills, it is useful to administer performance tests on the same skills periodically over a space of a semester or more.

Performance tests need to be carefully planned. This planning may involve all or most of the following:

- devising the situations or problems the students will be required to complete based on the unit or lesson objectives[1]
- developing a student task sheet in which you explain the tasks to be completed
- listing the materials, equipment, tools, etc., that will be available to the student
- establishing criteria or standards for evaluating the psychomotor performance[2]
- deciding what type of evaluation device to use
- developing the evaluation checklist or rating scale

To provide students with time for preparation and practice, they need to be informed in advance about upcoming performance tests. They should be told the purpose of the test and the time of the test. If students are to be tested individually, the other members of the class need to know what they will be expected to do when they are not involved in the testing. During their preparation/practice time, students can be provided with copies of the performance test to use in self-evaluating their own competency. This not only



gives them feedback which will allow them to correct errors; it also helps develop their ability to recognize quality procedures and products.

In competency-based vocational programs, performance testing is a basic and essential component. Very likely, the checklists or testing instruments will be included in the learning packages or modules the students complete in such programs. Students know in advance of instruction what performance is required of them, and what standards they will be expected to achieve. They can, thus, study and practice until they think they are ready to demonstrate the skill. At that point, they arrange with the instructor for the time and place of the performance test.

Performance tests are usually administered to one student at a time, since it is essential to check the performance step by step, as well as to check the completed product or end results. If the skills performance does not involve very small manipulations, it may be possible to administer a performance test to a small group of students, providing you can be positioned so as to observe every student. In addition to arranging the testing situation so that you can closely observe the performance, you need to be sure that you have all necessary materials and equipment available and properly placed for the test ahead of time.

In situations in which the product is the primary concern, close observation of the procedure may not be necessary. In that case, students can work independently and simply turn in the product to the teacher when it is completed. Even in this situation, however, it is very desirable for you to rate the product in the student's presence. In this way, you can suggest improvements, and the student can ask questions about the work, if necessary.

During testing, you also need to make sure that other students are not working in the same physical area in which the testing is being conducted, and that their activities will not distract or interfere with the students being tested. Following the testing, you should have a follow-up conference with each student to discuss your assessment of the performance. This helps students understand their progress and the areas of their performance needing improvement.

Testing Situations

In the classroom, performance testing can be used to evaluate the efficiency and effectiveness of students' skills in performing such operations as using a calculator, drawing plans, or writing shorthand. Checklists and rating scales could be de-

1. To gain skill in developing unit and lesson objectives in the knowledge, attitudes, and skills areas, you may wish to refer to Module B-2, *Develop Student Performance Objectives*, and Module B-3, *Develop a Unit of Instruction*.
2. To gain skill in establishing the criteria which underlie your measurement of student performance, you may wish to refer to Module D-1, *Establish Student Performance Criteria*.

veloped for making written observations concerning the accuracy of the performance, the time spent in completing a specified amount of work, or the general neatness of the outputs.

In laboratory situations in which students are practicing to improve their levels of performance, they can use checklists to evaluate the procedures used, and rating scales to evaluate their products. These same devices can then be used by the teacher in the final performance test.

The evaluation of psychomotor performance of students in on-the-job situations can be shared by the employer and the student since you are not present to observe the student at all times. If you decide to use employers or on-the-job instructors to help you rate student performance on the job, you need to explain to them (1) how to use checklists and rating scales to assess performance, (2) what standards of performance the scale levels represent, (3) how these devices relate to the achievement of the objectives of the on-the-job experience, and (4) what methods can be used to involve students in the evaluation process. You also need to suggest that a time schedule be developed for making these written observations. This ensures that when you make your on-the-job visits, you will be able to see what progress your students have made to date.

For further information on selecting and administering checklists and rating scales, you may wish to read Leighbody and Kidd, *Methods of Teaching Shop and Technical Subjects*, pp. 120–123; Boyd and Shimberg, *Handbook of Performance Testing*, pp. 1-29 and 76–179; and/or Popham, *Evaluating Instruction*, pp. 83–104.

The following items check your comprehension of the material in the information sheet, Selecting and Administering Evaluation Devices to Assess Student Psychomotor Performance, pp 6–9. Each of the five items requires a short essay-type response. Please explain fully, but briefly, and make sure you respond to all parts of each item.

SELF-CHECK

1. Write an objective for your occupational specialty that is primarily concerned with a skill (in the psychomotor domain), and explain why it can be classified as being in the psychomotor domain.

2. Place a check (✓) before each of the following verbs that could be used in writing a psychomotor objective.

_____Plan	_____Stretch	_____Guide
_____Praise	_____Fill	_____Paste
_____Analyze	_____Watch	_____Read

3. Why is it important to have specific devices for making written observations of student psychomotor performance?

4. For **one** of the following objectives, explain how a checklist, rating scale, or both could be used to evaluate student psychomotor performance.
   a. Using an electric sander, sand a walnut coffee table in preparation for the application of a lacquer finish.

b. Using a yeast roll dough, form Parker House rolls and place in tins ready for the oven.

c. Given a typewritten letter containing an error, correct the error so that the correction is not visible.

5. In administering psychomotor performance tests, what procedures should you follow?

NOTES

Compare your written responses on the Self-Check with the Model Answers given below. Your responses need not exactly duplicate the model responses; however, you should have covered the same **major** points.

MODEL ANSWERS

1. Your psychomotor objective should contain (a) an action verb, (b) a statement of a motor skill to be performed, (c) a statement of the procedures to be followed, and (d) a statement of what the finished product is to be. For example, "Using a prepared manuscript, type a copy of the manuscript at 32 words per minute with fewer than eight errors in 12 minutes or less."

2. ___ Plan ✓ Stretch ✓ Guide
   ___ Praise ✓ Fill ✓ Paste
   ___ Analyze ___ Watch ___ Read

   Note that the checked words describe observable motor behavior. The other words are verbs, but are not psychomotor in character and/or the actions described are difficult or impossible to observe to be sure that the student is **actually** performing the skill (e.g., "read").

3. We, as teachers, need guides to direct our observations. Since checklists and rating scales contain criteria for student performance, they provide guidance in helping make a teacher's observations more valid, reliable, objective, and complete.

4. For each of the three objectives, a checklist could be used to check the procedures used by the student in preparing the coffee table using a sander, forming Parker House rolls and placing them in tins, or correcting a typing error. A rating scale could then be used to judge the quality of the sanded wood, the quality of the shaped rolls, or the quality of the correction.

5. The administration of a psychomotor performance test should follow these guidelines.
   - Inform students in advance of the upcoming performance test.
   - Discuss with students how they will be evaluated, and on what skills they will be evaluated. If they will be self-evaluating, provide them with copies of the evaluation devices and explain how to use them.
   - Prepare the classroom and/or laboratory prior to testing. Make sure you have all materials and equipment available and placed appropriately, and that you can view the performance easily and clearly.
   - Arrange for students to be working on meaningful activities away from the testing area when they are not involved in the testing.
   - Observe and rate student performance.
   - Hold a follow-up conference with students to explain ratings they received.

LEVEL OF PERFORMANCE: Your completed Self-Check should have covered the same **major** points as the model responses. If you missed some points or have questions about any additional points you made, review the material in the information sheet, Selecting and Administering Evaluation Devices to Assess Student Psychomotor Performance, pp. 6–9, or check with your resource person if necessary.

NOTES

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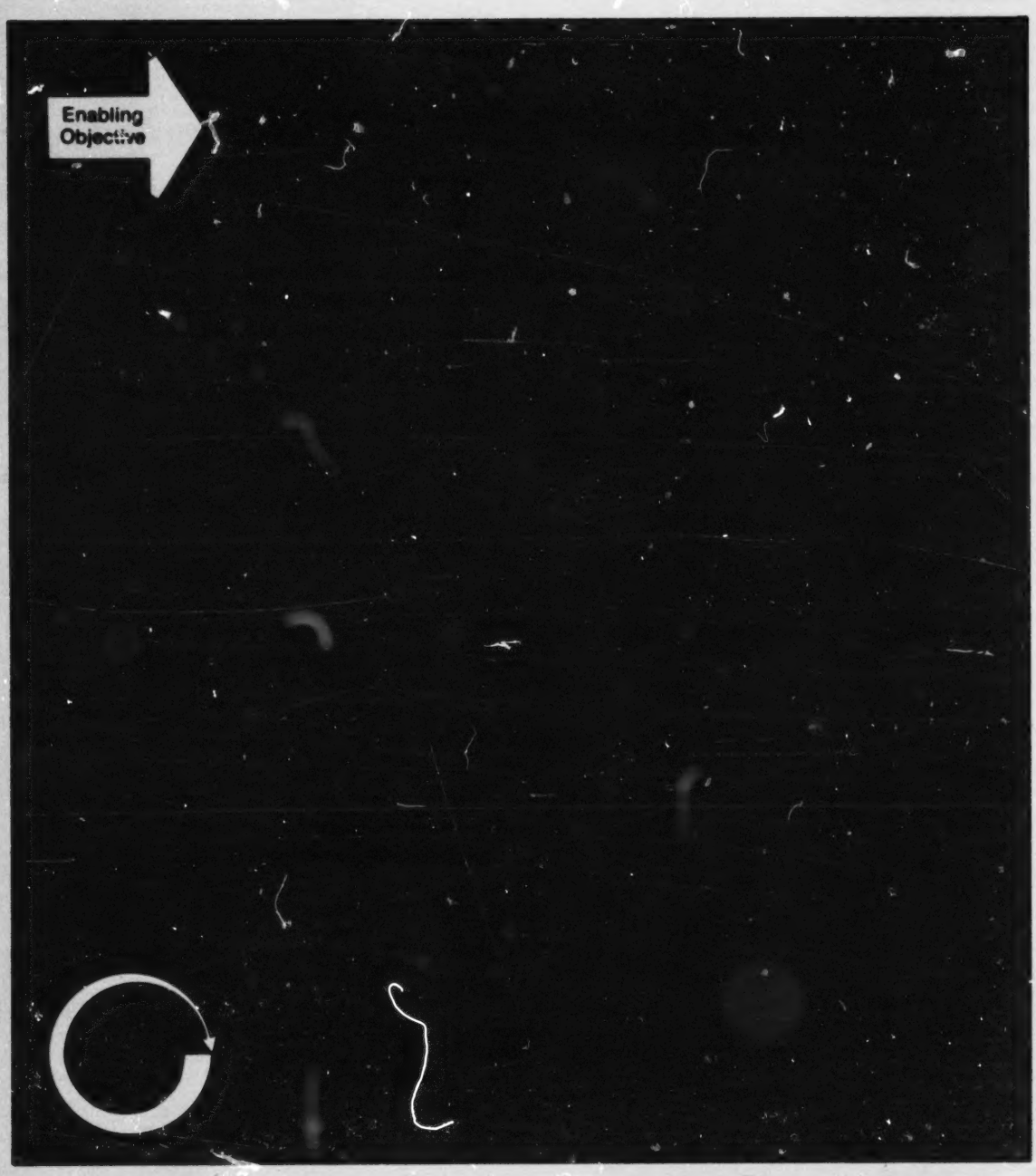
Learning Experience II

OVERVIEW



Activity

For information on how to plan for and construct psychomotor performance tests, read the following information sheet:

CONSTRUCTING PSYCHOMOTOR PERFORMANCE TESTS

Six major steps should be followed in constructing a performance test to measure achievement of an occupational skill. When the psychomotor skill is complex, all of these steps need to be carefully followed. However, in the case of simple tasks, some of steps (e.g., #2 and #3) may be omitted.

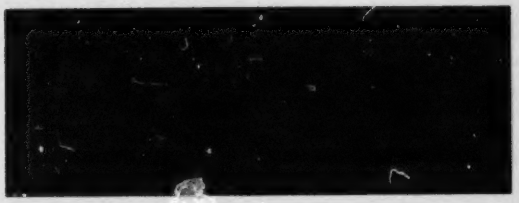
Step 1: Devising Situations or Problems

When developing statements describing a situation or problem, you need to be sure that specific details are given and that the solution involves the psychomotor performance (skill) you want to measure. For example—

In this situation, the specific role assigned to students is described as "preparing to do sales work by working in a fabric shop," and the problem situation is described as "a customer has asked for a quarter of a yard of velvet fabric."

Step 2: Developing a Task Sheet

Before developing the task sheet, you need to decide how detailed an explanation you want to give. You can give a very brief description, requiring the student to then fill in the details using knowledge and experience from previous lessons, or you can provide the needed details for the student. For example—



Step 3: Listing Materials, Equipment, Tools, etc.

When administering a performance test, you usually furnish the materials, tools, equipment, etc., that will be needed by the student. These items should be listed on the task sheet. This is especially helpful to students who are using performance tests to practice and self-evaluate. For example, the list developed for the situation described above would probably read—

Step 4: Developing Criteria for Performance

The performance criteria, which are usually stated as part of the psychomotor objective, serve as a standard for evaluating overall student performance. Standards for many psychomotor objectives have already been established by manufacturers of the equipment being used, by businesses in which the skill is used, or by textbook and manual authors. Some labor unions also have established minimum levels of performance. Vocational teachers are often also exposed to standards of performance in the technical courses they take at the post-secondary or college level.

The criteria stated within the objective need to be further broken out into *sub-criteria* of greater specificity. Sub-criteria are not part of the statement of the objective, but are listed separately. They spell out in more detail the procedures and key points the teacher will be looking for as the student performs the overall skill. These sub-criteria can be used in the checklist or rating scale you will use for evaluating student psychomotor performance. They should also be included on the task sheet. For example, sub-criteria for the velvet-cutting objective could be specified as follows:

I. Sub-criteria: Process
1. Fabric was placed flat on a horizontal surface that was free from dust and other damaging particles.
2. End of fabric was examined to see if it was grain-straight; if it was not, it was then cut grain-straight.
3. Fabric was placed flat against the table yard measuring marker.
4. Shears were used to snip the fabric exactly nine inches from the end.
5. With the fabric flat, the shears were used to cut the fabric along the grainline.

II. Sub-criteria: Product
1. The cut material is free from dust and other damaging particles.
2. The ends of the material are cut grain-straight.
3. The edge of the material is smoothly and evenly cut.
4. The cut material measures a full quarter yard (nine inches) in length.

Step 5: Deciding on Evaluation Strategy

In developing a performance test, sometimes you will want to evaluate the process used (the procedures followed), sometimes the final product, and at other times both process and product.

Evaluation of the final product may be the best choice if (1) the result is more critical than the procedures used to make it, (2) there are several possible equally acceptable processes that may be used, or (3) the process is difficult to observe and evaluate (e.g. developing film in complete darkness).

Process evaluation is needed (1) if you want to be sure a student can use tools and equipment correctly, (2) if the time used to complete the process is of concern, (3) if there are health or safety hazards involved in the process, or (4) if the final product cannot be evaluated without destroying the work. The process is usually evaluated by a **checklist.** If the **product** is to be evaluated, a **rating scale** is usually used. The sub-criteria developed for Step 4 are used in the body of the checklist and/or rating scale since they are the standards for student performance.

In some performance testing situations, you may want to pre-establish points at which student performance can be halted by the observer/evaluator. For instance, if expensive material would be ruined if the student were to continue on his or her present course, or if an important safety precaution were to be overlooked by the student, the performance should be stopped immediately.

In the case of the velvet-cutting situation, a checklist could be developed to evaluate the cutting **process,** and a rating scale could be developed to evaluate the finished **product,** the cut cloth. There could be points established in the process checklist for stopping the performance if it looks as if the velvet will be ruined if the student were to continue.

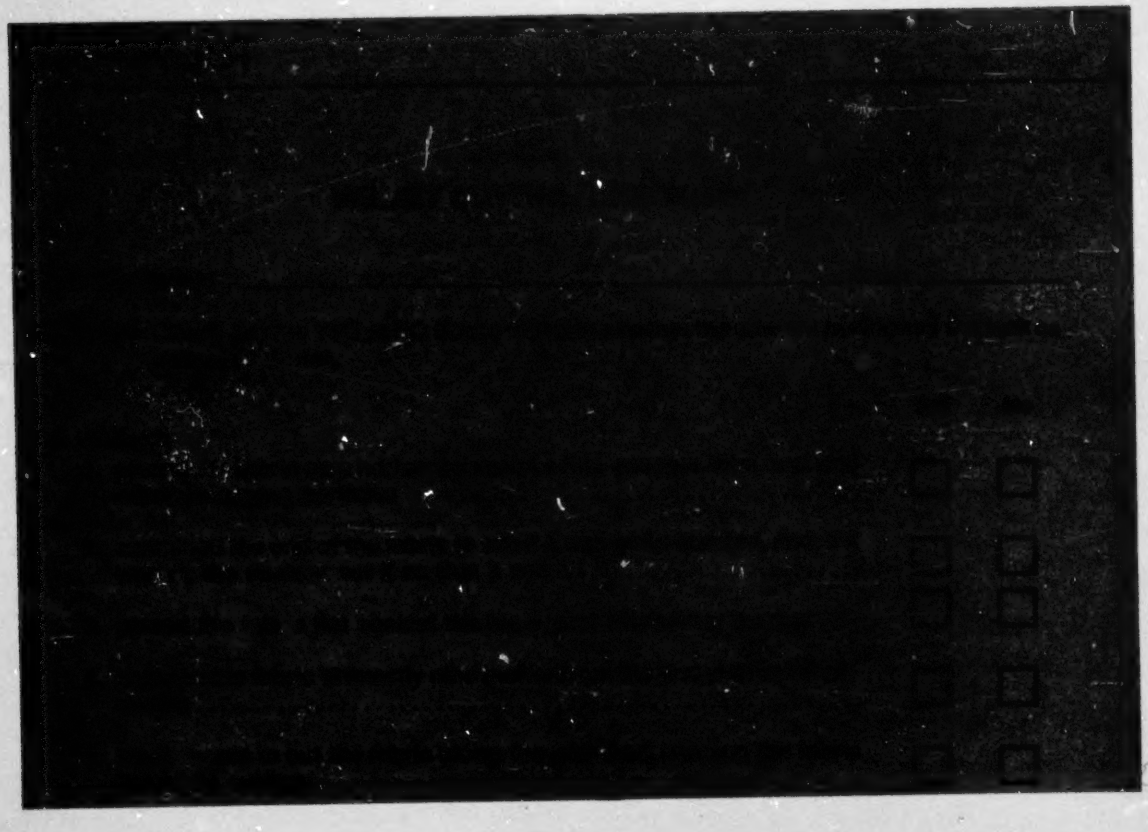
Step 6: Developing the Evaluation Instrument

Once you have determined the sub-criteria for the performance and the type of evaluation strategy to be followed, you can develop the evaluation instrument(s) needed.

If you will be evaluating the **process** that the student followed, the evaluation device you will need to develop will usually be a **checklist.** The process checklist should contain (1) space for the student's name, (2) space for the date, (3) directions for using the checklist, (4) a descriptive title, (5) criteria for evaluating the performance, and (6) YES and NO columns to check whether each item was completed or not. It is important to make the checklist self-explanatory so it can be used by students for self-evaluation purposes, by an employer or on-the-job instructor, as well as by you. An example of a checklist to evaluate process (in this case, velvet-cutting) is shown in Sample 1.

You will notice that in Sample 1 the checklist items come directly from the sub-criteria established for the process in Step 4. If you have completed Step 4, establishing items is a fairly straightforward process. There are two cautions that should be observed in developing items from sub-criteria: (1) each item should be clearly and simply stated so that it communicates easily to students, teachers, and employers or on-the-job instructors, and (2) the items must not be trivial or common knowledge (e.g., "the student used the shears with the proper hand"); they should be **important** parts of the skill. The items should represent all the **critical** steps involved in the process, and they should be listed in the order in which they are usually performed.

SAMPLE 1



One other element sometimes included in a checklist is a space for comments beneath each item. This practice is strongly recommended, in that it allows you to specify what exactly was wrong with the student's performance of a given item—information which is helpful in providing the student with feedback following the performance test. It may also be useful to provide a column marked "NA" (Not Applicable) to be checked in situations in which the criteria are inappropriate or do not apply (e.g., where students may be performing on a variety of machines with slightly different controls).

If the process is more complex or more critical, or if you wish to evaluate the **quality** of the **product**, a **rating scale** is usually used. The rating scale allows you to be more discriminating in your evaluation of each student's performance. Instead of simply checking whether or not each item was completed, the rating scale allows you to indicate **how well** it was completed.

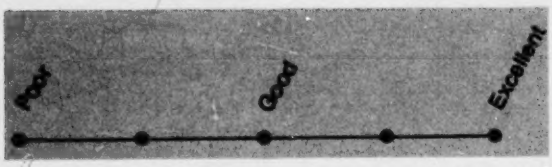
Authorities say that at least **five levels of quality** should be specified in a good rating scale, with **descriptions** given for at least three of the five levels. For example, the **directions** might indicate

that a 1–5 scale will be used, and give a description for these levels as follows.

5 – excellent, meets all standards
4 – very good, meets most standards
3 – good, meets some standards
2 – fair, meets a few standards
1 – poor, not up to standard

Or, the descriptors could be included **in the scale itself.** For example—

Poor	Fair	Good	Very Good	Excellent



As with the checklist, space can be left after each item for comments.

Well-constructed product rating forms, containing all of the essential quality criteria as well as explanations of the various levels of quality used in the rating scale, are very useful tools in teaching students to **self-evaluate.** Such rating scales can be constructed with two columns for rating the product (or process), one for the **student,** and one for the **instructor.** For example—

Student's Rating					Instructor's Rating				
5	4	3	2	1	5	4	3	2	1

After both the student and instructor have rated the performance, a follow-up conference can be held to discuss differences in the ratings, to resolve any questions the student may have, and to determine whether the performance needs to be repeated.

A rating scale prepared for the product resulting from our velvet-cutting situation is shown in Sample 2. Again, you will notice that the items in the checklist were drawn directly from the subcriteria developed in Step 4 for the product.

SAMPLE 2

Whether you are developing a checklist or a rating scale, it is important that the device be both valid and reliable.[3] The **validity** of a checklist or rating scale (whether it evaluates what it is supposed to) can be determined, in part, by examining the psychomotor objective and instructional content to see that the device includes all the items that the student needs to perform during the process, or that the product must exhibit, for the student to achieve the objective.

Also, the items can be compared against procedures or characteristics of quality items as listed in manuals and textbooks to be sure none are omitted. In addition, fellow teachers can review the devices to check for the clearness of the wording of the items and the completeness of the devices.

3. To gain skill in constructing valid and reliable tests to measure achievement of student performance objectives, you may wish to refer to Module D–2, *Assess Student Performance: Knowledge*.

The **reliability** of a checklist or rating scale (whether it consistently measures what it is intended to measure) is largely determined by your personal experience with the device. The items need to be clear and detailed enough that your interpretation of an item is consistent each time you use the device. In addition, you need practice in observing performances and recording your observations, especially in a busy laboratory or shop, or situations in which you must observe group performance.

Sometimes you will find that you can only spot-check performance because of limits of time or group size. In such cases, be sure that you make enough observations to be able to accurately assess how well each student is performing.

Translating the results of checklists or rating scales into a letter grade will depend to a certain extent on your personal standards as an instructor and the philosophy of the school concerning grading procedures.[4] For a checklist, the instructor may decide that a grade of **A** requires a perfect performance, a **B** is given for one or two unsatisfactory items, a **C** for three or four, and so on.

A rating scale can be similarly graded, or the scores on each of the items can be summed and divided by the number of items to obtain a mean score. Letter grades can be given in accordance with this mean score (5=A, 4.5=A−, 4=B, etc.) None of these systems is completely satisfactory.

In a competency-based program, the student is usually required to complete all items on the rating scale with either a "good"or "excellent," or is required to continue to learn the skill. In this case, a grade of **A** can be reserved for those who do an outstanding job, while all other students get **B.** No matter what system is used, students should be clearly informed about it before they proceed with the test. In all student evaluation, but especially in testing occupational skills, there should be no mystery or doubt about what is to be expected of the student.

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4. To gain skill in developing a grading system, you may wish to refer to Module D–5, *Determine Student Grades.*

For further information on constructing performance tests, you may wish to read Popham, *Evaluating Instruction*, pp. 61–82.

Select one or more student performance objectives in your occupational specialty which fall primarily in the psychomotor domain, and which involve both a process and a product.

Construct a performance test which could be used to assess students' achievement of the objective(s) you have selected. The performance test should include both a checklist and a rating scale.

After you have constructed your performance test, use the Performance Test Checklist, pp. 23–24, to evaluate your work.

PERFORMANCE TEST CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name _____

Date _____

Resource Person _____

LEVEL OF PERFORMANCE

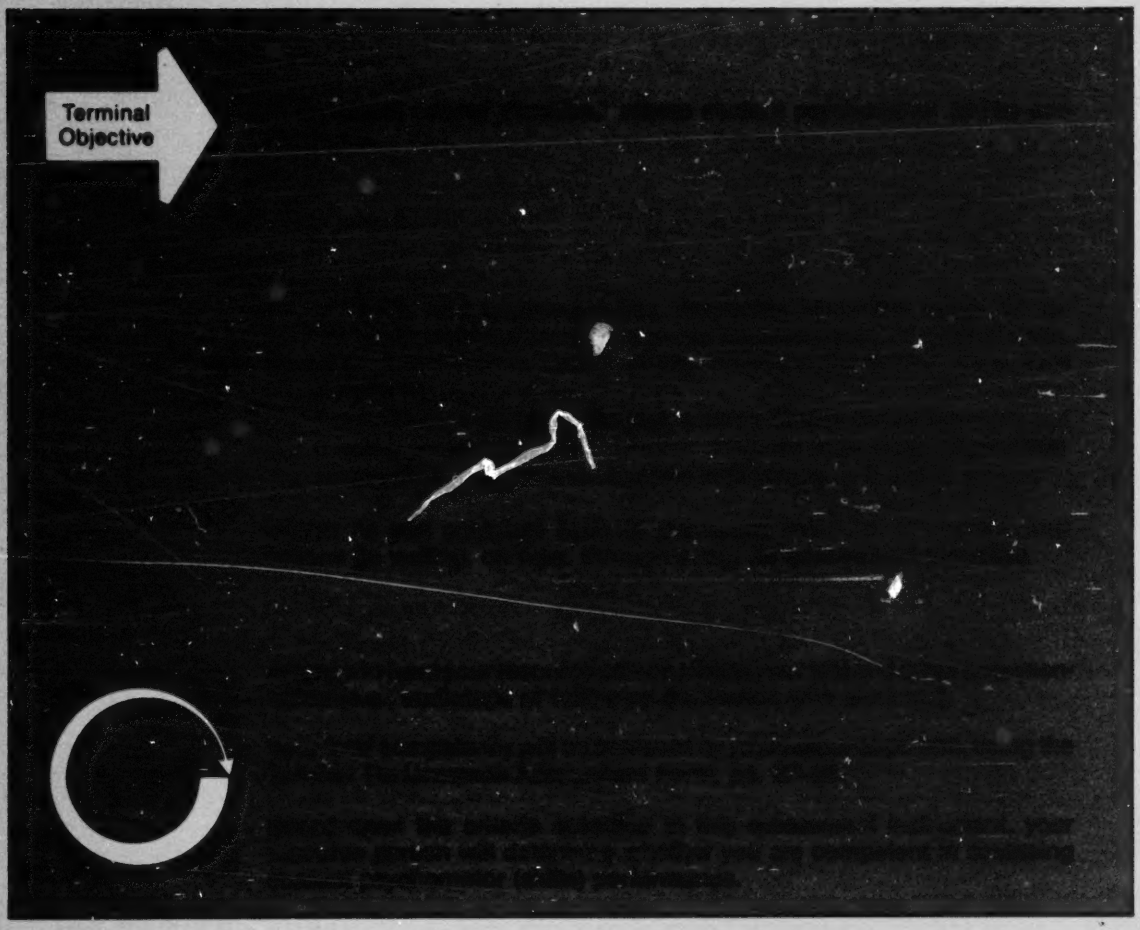
	N/A	No	Partial	Full
The Performance Test				
1. The problem or situation is appropriate for the psychomotor objective	☐	☐	☐	
2. The problem or situation is clearly stated	☐	☐	☐	
3. The problem or situation is complete—all needed details are included	☐	☐	☐	
4. The needed supplies and equipment are specified	☐	☐	☐	
5. Sub-criteria for performance are specified	☐	☐	☐	
6. Appropriate evaluation devices are specified	☐	☐	☐	
The Checklist				
7. Space is provided for student's name and date	☐	☐	☐	
8. Directions include a clearly written explanation of how the checklist is to be used	☐	☐	☐	
9. The items in the checklist are clearly written and easily interpreted by student and teacher	☐	☐	☐	
10. The items are arranged in the sequence in which the skill is normally performed	☐	☐	☐	
11. The items include all the important steps of the process (procedure) being performed	☐	☐	☐	
12. Space for written comments (e.g., diagnostic) is provided	☐	☐	☐	
The Rating Scale				
13. Space is provided for student's name and date	☐	☐	☐	
14. Directions include a clear explanation of the various ratings	☐	☐	☐	
15. The rating scale has at least a five-point scale with descriptors provided for at least three of the ratings	☐	☐	☐	

	N/A	No	Partial	Full
16. The items are clearly written and easily interpreted	☐	☐	☐	■
17. The items are arranged in a logical sequence	☐	☐	☐	■
18. The items cover all of the qualities of the product as implied in the objective	☐	☐	☐	■
19. Space for written comments (e.g., diagnostic) is provided	☐	☐	☐	■
General				
20. The checklist, rating scale, and performance test have clearly descriptive titles	☐	☐	☐	■

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, review the material in the information sheet, Constructing Psychomotor Performance Tests, pp. 16–21, revise your performance test accordingly, or check with your resource person if necessary.

Learning Experience III

FINAL EXPERIENCE



*For a definition of "actual school situation," see the inside back cover.

NOTES

TEACHER PERFORMANCE ASSESSMENT FORM

Assess Student Performance: Skills (D–4)

Name _____

Date _____

Resource Person _____

Directions: Indicate the level of the teacher's accomplishment by placing an X in the appropriate box under the LEVEL OF PERFORMANCE heading. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

	LEVEL OF PERFORMANCE					
	N/A	None	Poor	Fair	Good	Excellent
The Performance Test						
1. The problem or situation is appropriate for the psychomotor objective (is skill-centered)	☐	☐	☐	☐		
2. The problem or situation is clearly stated	☐	☐	☐	☐		
3. The problem or situation is complete—all needed details are included	☐	☐	☐	☐		
4. The needed supplies and equipment are specified	☐	☐	☐	☐		
5. Sub-criteria for performance are specified	☐	☐	☐	☐		
6. Appropriate evaluation devices are specified	☐	☐	☐	☐		
The Checklist						
7. Space is provided for student's name and date	☐	☐	☐	☐		
8. Directions include a clearly written explanation of how the checklist is to be used	☐	☐	☐	☐		
9. The items in the checklist are clearly written and easily interpreted	☐	☐	☐	☐		
10. The items are arranged in the sequence in which the skill is normally performed	☐	☐	☐	☐		
11. The items include all the important steps of the process (procedure) being performed	☐	☐	☐	☐		
12. Space for written comments is provided	☐	☐	☐	☐		
The Rating Scale						
13. Space is provided for student's name and date	☐	☐	☐	☐		
14. Directions include a clear explanation of the various ratings	☐	☐	☐	☐		
15. The rating scale has at least a five-point scale with descriptors provided for at least three of the ratings	☐	☐	☐	☐		

	N/A	None	Poor	Fair	Good	Excellent
16. The items are clearly written and easily interpreted	☐	☐	☐	☐		
17. The items are arranged in a logical sequence	☐	☐	☐	☐		
18. The items cover all of the qualities of the product as implied in the objective	☐	☐	☐	☐		
19. Space for written comments (e.g., diagnostic) is provided	☐	☐	☐	☐		
General						
20. The checklist, rating scale, and performance test have clearly descriptive titles	☐	☐	☐	☐		
Administration						
21. The performance test was discussed with the students prior to giving the test	☐	☐	☐	☐		
22. The students were prepared to self-evaluate their performance (optional)	☐	☐	☐	☐		
23. The performance testing situation was arranged to allow for teacher observation	☐	☐	☐	☐		
24. Materials and equipment needed were assembled and arranged in advance	☐	☐	☐	☐		
25. Quiet was maintained in the testing area	☐	☐	☐	☐		
26. The teacher observed and recorded his or her observations while the testing was occurring	☐	☐	☐	☐		
27. Students not involved in testing were provided with meaningful activities to complete	☐	☐	☐	☐		
28. The teacher discussed with the students the results of their performance	☐	☐	☐	☐		

LEVEL OF PERFORMANCE: All items must receive N/A, GOOD, or EXCELLENT responses. If any item receives a NONE, POOR, or FAIR response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

ABOUT USING THE CENTER'S PBTE MODULES

Organization

Each module is designed to help you gain competency in a particular skill area considered important to teaching success. A module is made up of a series of learning experiences, some providing background information, some providing practice experiences, and others combining these two functions. Completing these experiences should **enable** you to achieve the **terminal** objective in the final learning experience. The final experience in each module always requires you to demonstrate the skill in an actual school situation when you are an intern, a student teacher, or an inservice teacher.

Procedures

Modules are designed to allow you to individualize your teacher education program. You need to take only those modules covering skills which you do not already possess. Similarly, you need not complete any learning experience within a module if you already have the skill needed to complete it. Therefore, before taking any module, you should carefully review (1) the Introduction, (2) the Objectives listed on p. 4, (3) the Overviews preceding each learning experience, and (4) the Final Experience. After comparing your present needs and competencies with the information you have read in these sections, you should be ready to make one of the following decisions:

- that you do not have the competencies indicated, and should complete the entire module
- that you are competent in one or more of the enabling objectives leading to the final learning experience, and thus can omit that (those) learning experience(s)
- that you are already competent in this area, and ready to complete the final learning experience in order to "test out"
- that the module is inappropriate to your needs at this time

When you are ready to take the final learning experience and have access to an actual school situation, make the necessary arrangements with your resource person. If you do not complete the final experience successfully, meet with your resource person and arrange (1) to repeat the experience, or (2) complete (or review) previous sections of the module or other related activities suggested by your resource person before attempting to repeat the final experience.

Options for recycling are also available in each of the learning experiences preceding the final experience. Any time you do not meet the minimum level of performance required to meet an objective, you and your resource person may meet to select activities to help you reach competency. This could involve (1) completing parts of the module previously skipped; (2) repeating activities; (3) reading supplementary resources or completing additional activities suggested by the resource person; (4) designing your own learning experience; or (5) completing some other activity suggested by you or your resource person.

Terminology

Actual School Situation . . . refers to a situation in which you are actually working with, and responsible for, secondary or post-secondary vocational students in a real school. An intern, a student teacher, or an inservice teacher would be functioning in an actual school situation. If you do **not** have access to an actual school situation when you are taking the module, you can complete the module **up to** the final learning experience. You would then do the final learning experience later; i.e., when you have access to an actual school situation.

Alternate Activity or Feedback . . . refers to an item or feedback device which may **substitute** for required items which, due to special circumstances, you are unable to complete.

Occupational Specialty . . . refers to a specific area of preparation within a vocational service area (e.g., the service area Trade and Industrial Education includes occupational specialties such as automobile mechanics, welding, and electricity).

Optional Activity or Feedback . . . refers to an item which is not required, but which is designed to **supplement** and enrich the required items in a learning experience.

Resource Person . . . refers to the person in charge of your educational program; the professor, instructor, administrator, supervisor, or cooperating/supervising/classroom teacher who is guiding you in taking this module.

Student . . . refers to the person who is enrolled and receiving instruction in a secondary or post-secondary educational institution.

Vocational Service Area . . . refers to a major vocational field: agricultural education, business and office education, distributive education, health occupations education, home economics education, industrial arts education, technical education, or trade and industrial education.

You or the Teacher . . . refers to the person who is taking the module.

Levels of Performance for Final Assessment

N/A . . . The criterion was not met because it was **not applicable** to the situation.
None . . . **No attempt** was made to meet the criterion, although it was relevent.
Poor . . . The teacher is unable to perform this skill or has only **very limited ability** to perform it.
Fair . . . The teacher is unable to perform this skill in an acceptable manner, but has **some ability** to perform it.
Good . . . The teacher is able to perform this skill in an **effective** manner.
Excellent . . . The teacher is able to perform this skill in a **very effective** manner.

Titles of The Center's Performance-Based Teacher Education Modules

Category A: Program Planning, Development, and Evaluation

A-1 Prepare for a Community Survey
A-2 Conduct a Community Survey
A-3 Report the Findings of a Community Survey
A-4 Organize an Occupational Advisory Committee
A-5 Maintain an Occupational Advisory Committee
A-6 Develop Program Goals and Objectives
A-7 Conduct an Occupational Analysis
A-8 Develop a Course of Study
A-9 Develop Long-Range Program Plans
A-10 Conduct a Student Follow-Up Study
A-11 Evaluate Your Vocational Program

Category B: Instructional Planning

B-1 Determine Needs and Interests of Students
B-2 Develop Student Performance Objectives
B-3 Develop a Unit of Instruction
B-4 Develop a Lesson Plan
B-5 Select Student Instructional Materials
B-6 Prepare Teacher-Made Instructional Materials

Category C: Instructional Execution

C-1 Direct Field Trips
C-2 Conduct Group Discussions, Panel Discussions, and Symposiums
C-3 Employ Brainstorming, Buzz Group, and Question Box Techniques
C-4 Direct Students in Instructing Other Students
C-5 Employ Simulation Techniques
C-6 Guide Student Study
C-7 Direct Student Laboratory Experience
C-8 Direct Students in Applying Problem-Solving Techniques
C-9 Employ the Project Method
C-10 Introduce a Lesson
C-11 Summarize a Lesson
C-12 Employ Oral Questioning Techniques
C-13 Employ Reinforcement Techniques
C-14 Provide Instruction for Slower and More Capable Learners
C-15 Present an Illustrated Talk
C-16 Demonstrate a Manipulative Skill
C-17 Demonstrate a Concept or Principle
C-18 Individualize Instruction
C-19 Employ the Team Teaching Approach
C-20 Use Subject Matter Experts to Present Information
C-21 Prepare Bulletin Boards and Exhibits
C-22 Present Information with Models, Real Objects, and Flannel Boards
C-23 Present Information with Overhead and Opaque Materials
C-24 Present Information with Filmstrips and Slides
C-25 Present Information with Films
C-26 Present Information with Audio Recordings
C-27 Present Information with Televised and Videotaped Materials
C-28 Employ Programmed Instruction
C-29 Present Information with the Chalkboard and Flip Chart

Category D: Instructional Evaluation

D-1 Establish Student Performance Criteria
D-2 Assess Student Performance: Knowledge
D-3 Assess Student Performance: Attitudes
D-4 Assess Student Performance: Skills
D-5 Determine Student Grades
D-6 Evaluate Your Instructional Effectiveness

Category E: Instructional Management

E-1 Project Instructional Resource Needs
E-2 Manage Your Budgeting and Reporting Responsibilities
E-3 Arrange for Improvement of Your Vocational Facilities
E-4 Maintain a Filing System
E-5 Provide for Student Safety
E-6 Provide for the First Aid Needs of Students
E-7 Assist Students in Developing Self-Discipline
E-8 Organize the Vocational Laboratory
E-9 Manage the Vocational Laboratory

Category F: Guidance

F-1 Gather Student Data Using Formal Data-Collection Techniques
F-2 Gather Student Data Through Personal Contacts
F-3 Use Conferences to Help Meet Student Needs
F-4 Provide Information on Educational and Career Opportunities
F-5 Assist Students in Applying for Employment or Further Education

Category G: School-Community Relations

G-1 Develop a School-Community Relations Plan for Your Vocational Program
G-2 Give Presentations to Promote Your Vocational Program
G-3 Develop Brochures to Promote Your Vocational Program
G-4 Prepare Displays to Promote Your Vocational Program
G-5 Prepare News Releases and Articles Concerning Your Vocational Program
G-6 Arrange for Television and Radio Presentations Concerning Your Vocational Program
G-7 Conduct an Open House
G-8 Work with Members of the Community
G-9 Work with State and Local Educators
G-10 Obtain Feedback about Your Vocational Program

Category H: Student Vocational Organization

H-1 Develop a Personal Philosophy Concerning Student Vocational Organizations
H-2 Establish a Student Vocational Organization
H-3 Prepare Student Vocational Organization Members for Leadership Roles
H-4 Assist Student Vocational Organization Members in Developing and Financing a Yearly Program of Activities
H-5 Supervise Activities of the Student Vocational Organization
H-6 Guide Participation in Student Vocational Organization Contests

Category I: Professional Role and Development

I-1 Keep Up-to-Date Professionally
I-2 Serve Your Teaching Profession
I-3 Develop an Active Personal Philosophy of Education
I-4 Serve the School and Community
I-5 Obtain a Suitable Teaching Position
I-6 Provide Laboratory Experiences for Prospective Teachers
I-7 Plan the Student Teaching Experience
I-8 Supervise Student Teachers

Category J: Coordination of Cooperative Education

J-1 Establish Guidelines for Your Cooperative Vocational Program
J-2 Manage the Attendance, Transfers, and Terminations of Co-Op Students
J-3 Enroll Students in Your Co-Op Program
J-4 Secure Training Stations for Your Co-Op Program
J-5 Place Co-Op Students on the Job
J-6 Develop the Training Ability of On-the-Job Instructors
J-7 Coordinate On-the-Job Instruction
J-8 Evaluate Co-Op Students' On-the-Job Performance
J-9 Prepare for Students' Related Instruction
J-10 Supervise an Employer-Employee Appreciation Event

RELATED PUBLICATIONS

Student Guide to Using Performance-Based Teacher Education Materials
Resource Person Guide to Using Performance-Based Teacher Education Materials
Guide to the Implementation of Performance-Based Teacher Education

For information regarding availability and prices of these materials contact—

AAVIM
American Association for Vocational Instructional Materials
120 Engineering Center • Athens, Georgia 30602 • (404) 542-2586